

Cellular and Molecular Biology, Block 1 Weekly Formative Questions
Week 4 (September 10-September 14, 2012)

Manning – Carbohydrates: General Properties

1. Which of the following statements best characterizes glucose?
 - A. It usually exists in the furanose form.
 - B. It is a ketose.
 - C. Carbon 2 is the anomeric carbon atom.
 - D. It forms part of the disaccharide lactose.
 - E. It is oxidized to form sorbitol.

2. All of the following are reducing sugars EXCEPT
 - A. glucose.
 - B. lactose.
 - C. fructose.
 - D. sucrose.
 - E. maltose.

Manning - Glycolysis

3. Which of the following enzyme-catalyzed reactions has a product containing a newly formed high-energy phosphate bond?
 - A. The phosphorylation of glucose
 - B. The phosphorylation of fructose 6-phosphate
 - C. 1,3-Bisphosphoglyceric acid to 3-phosphoglyceric acid
 - D. Dihydroxyacetone phosphate to glyceraldehyde 3-phosphate
 - E. Fructose 1,6-diphosphate to glyceraldehyde 3-phosphate and dihydroxyacetone phosphate.

4. The oxidation of 1 mole of glucose by anaerobic glycolysis yields a net of
 - A. 2 moles of lactate and 2 moles of adenosine triphosphate (ATP).
 - B. 2 moles of lactate, 2 moles of reduced nicotinamide-adenine dinucleotide (NADH), and 2 moles of ATP.
 - C. 2 moles of lactate, 2 moles of NAD⁺, and 6 moles of ATP.
 - D. 2 moles of pyruvate and 2 moles of ATP.
 - E. 2 moles of pyruvate, 2 moles of NADH, and 2 moles of ATP.

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Dr. Manning Pentose Phosphate Pathway

5. Which one of the following statements is INCORRECT? Glucose 6-phosphate
- A. is oxidized by the enzyme glucose 6-phosphate dehydrogenase; (G-6-PD).
 - B. yields the compounds 6-phosphogluconolactone and NADPH in the first step in its oxidation.
 - C. has an increased rate of oxidation in G-6-PD deficiency.
 - D. is hydrolyzed to glucose and orthophosphate by the cytoplasmic enzyme glucose 6-phosphatase.
 - E. is synthesized from ATP and glucose by the enzyme hexokinase.
6. Which one of the following statements does NOT apply to the pentose phosphate pathway?
- A. Ribulose 5-phosphate and ribose 5-phosphate are produced
 - B. All of the carbon atoms are shunted back into the glycolytic pathways
 - C. NADPH is produced
 - D. It involves the formation of C₃, C₄, C₅, C₆ and C₇ sugars
 - E. It occurs in red blood cells

Dr. Manning Interconversion of Hexoses

For Questions 7 and 8, match the following characteristics or symptoms to the correct disorder.

- A. Glucose-6-phosphate dehydrogenase deficiency
 - B. Wernicke-Korsakoff syndrome
 - C. Hereditary fructose intolerance
 - D. Diabetes mellitus
 - E. Classic galactosemia
7. This disorder is treated by a diet devoid of milk products.
8. An infant being weaned off breast milk begins to exhibit poor health when fruit juice and sweets are introduced into its diet.

**Cellular and Molecular Biology, Block 1 Weekly Formative Questions
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Dr. Chiaia - Muscle 2

9. Cardiac muscle tissue is characterized by
- A. a nucleus (1 or 2) located in the center of the cell.
 - B. is striated involuntary muscle.
 - C. intercalated discs which hold cardiac cells together at their adjacent ends.
 - D. branching fibers consisting of cells tightly adherent to one another at their adjacent ends.
 - E. All of the above are correct.
10. Which of the following statement(s) concerning muscle is (are) **CORRECT**?
- A. A triad consists of two T-tubules and a centrally located terminal cisterna of the sarcoplasmic reticulum
 - B. At the myoneural junction, acetylcholine is released by axon terminals
 - C. Both A and B are correct
 - D. Neither A nor B is correct

Chiaia – Muscle 3

11. The sarcolemmal specialization found at the neuromuscular junction designed to increase surface area of the junction is known as a
- A. myocisternae.
 - B. junctional folds.
 - C. motor endplate.
 - D. Z-line.
 - E. motor tubule.
12. Individual muscle fibers are enclosed by a connective tissue covering termed the
- A. endomysium.
 - B. myomysium.
 - C. intermysium.
 - D. epimysium.
 - E. perimysium.

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Chiaia – The Structure of Neurons and Glia

13. Which of the following cells makes the myelin sheath found within the CNS?
- A. Microglia
 - B. Protoplasmic astrocyte
 - C. Satellite cell
 - D. Schwann cell
 - E. Oligodendrocyte
14. Nissl substance or bodies actually is the light microscope version of what?
- A. Golgi apparatus
 - B. Synaptic vesicles
 - C. RER and polysome areas
 - D. Groups of neurofilament
 - E. The Axon hillock

Lee – Muscle 4

15. Following statements are related to descriptions of muscle mechanics. An INCORRECT one is
- A. Muscle torque generation will increase as the velocity of movement increases.
 - B. Muscle force generation with isolated muscle preparation is greatest at an optimal resting length (2-2.2 μ m).
 - C. Muscle power increases as the velocity of movement increases to a certain point, thereafter, decreases with a further increase in movement velocity.
 - D. A muscle that consists predominantly of fast twitch muscle fibers will generate greater torque than does a muscle that consists predominantly of slow twitch muscle fibers at a given velocity of movement.
 - E. All above are correct
16. An incorrect statement about muscle pennation is
- A. Soleus is bipennated muscle.
 - B. More muscle fibers can be packed in pennated muscle than non-pennated muscle in a given volume of muscle.
 - C. The cross sectional area of pennated muscle is usually greater than that in non-pennated muscle.
 - D. Some of muscle fiber force in pennated muscle is likely lost during muscle contraction due to the pennated angle of fibers.

(See next page for answers)

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Instructor	Question	Answer
Dr. Manning	1	D
	2	D
	3	C
	4	A
	5	C
	6	B
	7	E
	8	C
Dr. Chiaia	9	E
	10	B
	11	B
	12	A
	13	E
	14	C
Dr. Lee	15	A
	16	A